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#### ***published in***

Cognition and Emotion  
2007

#### ***DOI (link to publisher)***

[10.1080/02699930701238495](https://doi.org/10.1080/02699930701238495)

#### ***document version***

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

#### ***citation for published version (APA)***

Rieffe, C. J., Meerum Terwogt, M., Bosch, J. D., Kneepkens, C. M. F., Douwes, A. C., & Jellesma, F. C. (2007). Interaction between emotions and somatic complaints in children who did or did not seek medical care. *Cognition and Emotion*, 21(8), 1630-1646. <https://doi.org/10.1080/02699930701238495>

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## **Interaction between emotions and somatic complaints in children who did or did not seek medical care**

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This study aimed to investigate how emotional functioning can be linked to health problems in children. Three groups were compared: (1) a clinical group, consisting of children with abdominal pain, attending an out-patient clinic; (2) a group from the general population who had high scores on a self-report somatic complaint list; and (3) a group from the general population who reported no or few somatic complaints. It was shown that groups 1 and 2 experienced negative moods and negative emotions with a higher frequency and/or intensity, and had a lower feeling of competence than group 3. They were also more likely to act upon physical complaints in emotionally stressful situations than group 3, although all groups made use of emotion-focused strategies. It is suggested that it is not an impaired capacity to identify emotions (an important feature of alexithymia), but an inability to differentiate between, and cope with, negative emotions that might be an important factor in children's health problems. Suggestions for future research are made.

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The authors wish to thank Nienke Hoekstra and Rozemarijn Martens for their help with data collection, Fouad Karimi for designing the drawings that were used in this study, and Anna Brett and Anne Miers for their corrections.

## INTRODUCTION

Approximately a third of all children between eight and eighteen years of age report headaches, stomach-aches or other physical complaints at least once a week (Garber, Walker, & Zeman, 1991; Roth-Isigkeit, Thyen, Raspe, Stoven, & Schmucker, 2004; Tamminen et al., 1991). A considerable number of these complaints will be seen within the health service. One of the most frequent pain complaints in children that medical doctors are presented with involves the gastrointestinal system. For example, recurrent abdominal pain can be found in 10% to 30% of all children, many of whom seek medical help (Di Lorenzo et al., 2005; Garber et al., 1991; Perquin et al., 2000a). However, apart from functional conditions such as chronic constipation and irritable bowel syndrome, a disease can be found in less than 10% of cases that seek medical help (Compas & Thomsen, 1999; Edwards, Mullins, Johnson, & Bernardy, 1994; Perquin et al., 2000a, 2000b). With this study, we hope to gain more knowledge about how impaired emotional functioning may contribute to children's health problems.

Many studies have shown a relationship between somatic complaints and impaired emotional functioning. Emotional factors such as stronger negative affect, more symptoms of depression or feelings of fear often co-occur with an increase in somatic complaints (Beidel, Christ, & Long, 1991; Bonner & Finney, 1996; Campo et al., 2004; Egger, Costello, Erkanli, & Angold, 1999; Garber et al., 1991; Jolly et al., 1994; Masi et al., 2004; Walker, Garber, Smith, Van Slyke, & Claar, 2001). Of course, negative affect may be brought about by the experience of physical discomfort. However, the link between negative affect is also consistent with the assumption that negative moods contribute to health complaints, an assumption that can be found especially in theories on functional somatic complaints (e.g., Favo & Sonino, 2000). Thinking of somatic complaints and emotional problems as having a reciprocal influence on each other is in line with the contemporary notion that a strict separation of "body" and "mind" is artificial (Van der Feltz-Cornelis & Van Dyck, 1997). Yet, it is still unclear exactly which emotional problems can be related to physical illness and how.

One aspect of emotional functioning that has been frequently studied in this respect is the identification and expression of one's own emotions. This focus finds its roots in Sifneos' concept of alexithymia, which refers to problems with the (cognitive) processing and regulation of emotional experiences and feelings. It is argued that an inability to identify one's own feelings in specific situations is a prominent characteristic of people with psychosomatic complaints (De Gucht, Fischler, & Heiser, 2004; Grabe, Spitzer, & Freyberger, 2004; Lundh & Simonsson-Sarnecki, 2001; Sifneos, 1996). A clear distinction here is made between *moods* (global affective states without a cause, object or onset) and *emotions* (affective states that are

directly linked to a specific event or situation; Frijda, 1993). It is assumed that people with alexithymia can identify their own mood states, but have a tendency to leave their emotions unidentified because they do not link their affective condition to specific situations, memories or expectations (Bagby & Taylor, 1999). Consequently, people who score high on alexithymia fail to analyse the situation in a way that helps them to deal with their emotions adaptively. An insufficient analysis of the causes of their affective states also impairs their coping potential and their negative feelings persist.

Here, it is important to note that every emotion consists of more or less notable physical reactions such as sweating, a faster heartbeat, and tension in the abdominal area. These reactions arise in support of the *action tendencies* or motivational urges associated with the emotion, and they reflect the body's attempt to physically prepare itself for behaviour that is adaptive to that particular situation (Frijda, 1986). For example, the body gets ready to run away (increased activity of the sympathetic nervous system and muscle tension) when one feels scared. Emotions that are intense and/or long lasting can have a harmful effect on one's physical functioning. A convincing body of evidence shows that acute and chronic stress have a negative effect on biological functioning and, in the long term, may even cause irreversible health problems in adults (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002; Segerstrom & Miller, 2004). Therefore, the continuation of negative feelings and the corresponding physical changes could explain the predominantly negative mood states and somatising tendencies that characterise high alexithymic people.

However, in a previous study with 10-year-old children from a non-clinical population it was found that the number of self-reported somatic complaints was unrelated to children's ability to identify their own emotions in conflicting situations with peers (Rieffe, Meerum Terwogt, & Bosch, 2004). A few children failed to identify an emotion on some occasions, but this finding was independent of children's self-reported somatic complaints. Instead, it was shown that children who had reported many somatic complaints recounted more frequent negative emotion-evoking situations than their well peers. In accordance with this, other studies showed that children with recurrent abdominal pain reported more frequent daily stressors than well children, both at home and in school situations (Sharrer & Ryan-Wenger, 1991; Walker et al., 2001). This strongly suggests that somatic complaints are related to an impaired social and emotional functioning.

Social and emotional competence includes various aspects such as the ability to analyse one's emotions, to apply effective coping skills (ways to deal with negative emotions) and self-esteem. Previous research has identified self-esteem as an important mediating variable in somatic complaints (Kronenberger, Laite, & Laclave, 1995; Raymer, Weininger, &

Hamilton, 1984). Several studies also suggest that children with more health complaints use fewer or less effective emotion-focused coping strategies (Sharrer & Ryan-Wenger, 1991; Walker et al., 2001). This can be explained by the symptom perception hypothesis (Pennebaker, 1984), which holds that somatic complaints are related to a tendency to misattribute physical reactions in an emotion-evoking situation to a medical cause. Consequently, the elements in the situation that triggered the negative emotion and the emotional impact of the situation are not adequately dealt with. This would cause the negative feeling to continue and lead to the frequently noted long-lasting negative mood states.

In this study we compared three groups on several emotion indices: (1) a clinical group, consisting of children with abdominal pain who were attending an out-patient clinic (OP); (2) a group from the general population who had a high score on a self-report somatic complaint list (HSC); and (3) a group from the general population who reported no or few somatic complaints (LSC). The first aim was to see if we could replicate the findings by Rieffe et al. (2004) in a clinical population. The first hypothesis was that children from the out-patient group would report more negative and less positive mood states than their well peers. Yet, it was also expected that the out-patient group would be able to identify their own emotions in hypothetically presented emotion-evoking peer situations. Furthermore, the expectation was that this group would report more frequent negative emotions than their well peers.

Additionally, we examined children's coping focus and their self-esteem. We wanted to investigate whether children with more health problems have a relatively restricted coping focus, which predominantly deals with their physical reactions in stressful events rather than the affective component. It was expected that children with more health problems (OP and HSC groups) would rely more often on physical solutions and neglect the emotional impact of the situation. For example, in a situation where one is nervous about an upcoming event and has a stomach-ache, it was expected that they would relatively often opt for taking a pill to deal with the physical complaints, whereas well children might more often deal with their anxiety through a cognitive reappraisal of the situation.

With respect to self-esteem, we expected that children with more health problems would feel less competent about their daily functioning. Besides a comparison of children's feelings of competence between the three groups, we also checked how important children would judge these different aspects of their daily functioning, as an indication of their ability to compensate. For example, if one is not good at gymnastics, it is useful to judge this capacity as less important and to value other areas, in which one feels more confident, as more important. We expected children with more health problems (OP and HSC groups) to compensate less in this respect. Based on the available

literature there is no reason to expect differences between the two groups with more health problems.

## METHOD

### Participants

In this study 40 children participated (20 boys, 20 girls, mean age 10 years and 3 months,  $SD = 18$  months, range = 8 years and 5 months to 13 years and 11 months) who had been referred by their GP to the paediatric out-patient clinic of the VU University Academic Medical Center with complaints of abdominal pain. The children were selected over a 4-month period on Wednesday and Thursday afternoons by the paediatric gastroenterologist. Of the 70 children within the age range who visited the clinic during this period on the days that we used for testing, 40 children had a functional abdominal pain complaint and were included in the study. All selected children agreed to participate.

The out-patient group was compared with two different control groups, which were drawn from primary schools around Leiden and Amsterdam, the Netherlands.

*Control sample 1.* For the comparison of mood, coping focus and self-esteem, out of a total group of 352 children, two groups of 50 children were selected (based on their score on the Somatic Complaint List, see procedure). Both groups were matched for gender and age with the out-patient group. The mean age for both selected groups was 10 years and 3 months ( $SD = 11$  months). Gender was equally divided over both selected groups.

*Control sample 2.* Data from a previous study were used for the comparison of emotion identification, because this measure was obtained individually outside the classroom, whereas the other measures involved questionnaires that were handed out in the classroom and we did not want children to miss their classes unnecessarily (see procedure). During this previous study, two groups of 26 children had been selected out of a group of 282 children (Rieffe et al., 2004). The mean age for both selected groups was 10 years and 2 months ( $SD = 14$  months), and the two groups consisted of 28 male and 24 female participants. In both control samples, all children agreed to participate.

Consent for participation was obtained for all children from their parents and the participating children. Approval for the study was also obtained by the medical ethical committee of the VU University Medical Center.

## Procedure

Possible participants from the OP group were selected by the paediatric gastroenterologist on the basis of their medical condition and age. During an appointment at the paediatric gastroenterology clinic the doctor explained the aims of this study to the selected children and their parents. They were then asked to participate. Children who agreed to participate were taken to a quiet, separate room and tested by a female experimenter. They filled in the questionnaires for mood, coping focus, self-esteem and the Somatic Complaint List (SCL). Additionally, they were presented with the 16 emotion-evoking vignettes, which were presented in random order. A test session lasted approximately 20 minutes.

The participants from primary schools were handed out the somatic complaint list (SCL) in class. Based on the SCL scores, we selected a group of children who reported no or almost no somatic complaints (SCL score  $\leq 11$ ) and a group of children with the highest SCL scores (SCL score  $\geq 15$ ).

The sample of 352 children filled in the mood, coping focus and self-esteem questionnaires and the SCL. Only the scores of the  $2 \times 50$  selected children were used for this study. The sample of 282 children that were used in a previous study (Rieffe et al., 2004), had filled in the mood questionnaire and the SCL. The selected children from this sample ( $2 \times 26$ ) had also been tested individually two weeks later in a separate, quiet room, in a session of approximately 10 minutes' duration. In this session, the experimenter presented the children with 16 emotion-evoking vignettes in random order.

## Materials

### *Somatic Complaint List*

The Somatic Complaints List reflects the most common complaints in children as identified by teachers (Rieffe, Oosterveld, & Meerum Terwogt, 2006). Children were asked to score 8 items on a Likert-type scale (1 = *never*, 2 = *sometimes*, 3 = *often*). An example of an item is: "I never/sometimes/often have a stomach-ache". Participants obtained a score of 8 when they responded "never" on all items, and they obtained a maximum score of 24 when they responded "often" on all items (this scoring was reversed for two items, which were positively formulated). The internal consistency of the scale was good in previous studies and the scale showed a strong divergent validity with other instruments (Jellesma, Rieffe, & Meerum Terwogt, in press; Meerum Terwogt, Rieffe, Miers, Jellesma, & Tolland, 2006; Rieffe et al., 2006). This study confirmed the SCL's high internal consistency (see Table 1).

TABLE 1  
Psychometric properties of the questionnaires ( $n=352$ )

<i>Questionnaire</i>	<i>Number of items</i>	<i>Cronbach's alpha</i>	<i>Min-max score</i>
SCL	8	.72	8–24
<i>Mood questionnaire</i>			
Happiness	4	.84	0–12
Sadness	4	.79	0–12
Anger	4	.74	0–12
Fear	4	.75	0–12
<i>Coping focus</i>			
Physical	12	.82	1–3*
Emotion	10	.77	1–3*
<i>Self-esteem</i>			
Competence	19	.86	19–57
Importance	19	.90	19–57

*Note:* \*Total scores per scale are divided by number of items in order to make scale scores compatible.

### *Mood Questionnaire*

The Mood Questionnaire (Rieffe et al., 2006) comprises 4 mood scales (anger, happiness, sadness and fear), each consisting of 4 items. Thus, the total list consists of 16 items. Children were asked, “How have you been feeling lately?” as an introduction to these 16 items. Children were asked to score each item on a Likert-type scale (0 = *never*, 1 = *sometimes*, 2 = *often*). An example of an item is: “I never/sometimes/often feel angry”. The internal consistency for each mood-scale was good in previous studies (Meerum Terwogt et al., 2006; Rieffe et al., 2006), which was again confirmed in this study (see Table 1). The questionnaire also showed a strong convergent validity with related aspects, such as depression (CDI; Kovacs, 1992) and anxiety (SAS-K; Dekking, 1983; Meerum Terwogt et al., 2006).

### *Coping Focus Questionnaire*

The Coping Focus Questionnaire consisted of 22 short descriptions of stressful events (Meerum Terwogt et al., 2006). The emotional experience as well as the corresponding physical reaction were explicitly stated. A possible reaction was then formulated. The reactions aimed to deal with the emotion or with the physical response. Children were asked to what extent they would endorse this reaction and asked to score each item on a Likert-type scale (1 = *not*, 2 = *maybe*, 3 = *certainly*). Two scales were constructed based on the summed scores, Physical Focus (12 items) and Emotion Focus (10 items). The internal consistencies for both scales were good in a previous study



(Meerum Terwogt et al., 2006), which was confirmed in this study (Table 1). The questionnaire also showed strong and expected correlations with other measures, such as depression (CDI; Kovacs, 1992) and anxiety (SAS-K; Dekking, 1983; Meerum Terwogt et al., 2006).

An example of a vignette that aimed to deal with the emotional experience is: "It is your turn today to give a talk in front of your class. Before you start, you feel nervous and you feel sick" – "I would not/maybe/certainly practice in the break, so I'd be less nervous".

An example of a vignette that dealt with the physical experience is: "Today, you are going to have your first tennis lesson. You don't know anyone there. You feel frightened and you get a stomach-ache" – "I would not/maybe/certainly take a pill for my stomach-ache".

### *Self-esteem questionnaire*

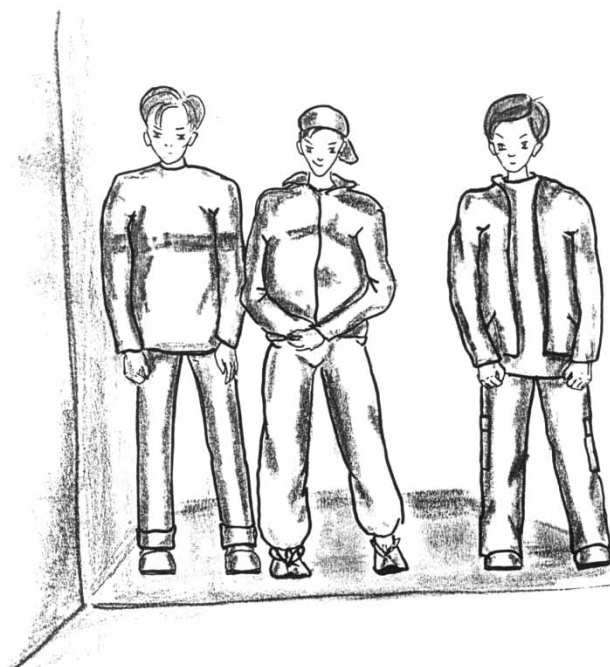
This questionnaire was especially developed for this study, because we did not only want to measure in which domains children have low or high self-esteem, but also to what extent children are able to compensate for those aspects of their functioning that they value the least. Therefore, children's self-esteem was measured in two steps.

*Competence.* First, children were asked to complete a self-report questionnaire consisting of 19 short items, which represented four relevant domains (peers, academic achievement, appearance and parents). They were asked to score each item on a Likert-type scale (1 = *never*, 2 = *sometimes*, 3 = *often*). An example of an item is: "Other children never/sometimes/often like to sit next to me".

*Importance.* Second, children were presented with a parallel version of the self-esteem questionnaire, but this time they were asked to rate the importance of each item. An example is: "I think it is not/a little/very important that other children like to sit next to me". The internal consistency for both tests were good (see Table 1) and the self-esteem questionnaire showed a strong convergent validity with the CBSK (Veerman, Straathof, Treffers, Van den Bergh, & Brink, 1997), which is the well-established Dutch version of Harter's self-esteem scale "the Self-Perception Profile for Children (Harter, 1985).

### *Emotion-evoking vignettes*

This material consisted of 16 stories (each with a drawing to illustrate the situation, see Figure 1 for an example), which described emotion-eliciting situations (Rieffe et al., 2004). Four stories were designed for each of four emotions; happiness, fear, anger and sadness. After hearing each



**Figure 1.** Example of an emotion-eliciting situation: “Three big boys won’t let you pass ...”.

story participants were asked: “How would you feel?” (question 1). However, the same situation can evoke different emotions in different people and whereas one person reacts with anger, someone else might become sad in the same situation (Stein & Trabasso, 1989). Therefore, children’s emotion responses were not judged as to whether they were appropriate or not, rather the criterion was how many times children named a negative or a positive emotion. If participants failed to identify an emotion they were asked once: “Would you feel happy, sad, angry or afraid?” This question was asked equally often for all three groups (on 15% of trials). If participants reported more than one emotion, for example “I would feel sad and angry”, the experimenter asked which was the stronger of the two emotions, before asking about the intensity of the emotion experience. In all three groups, this happened on fewer than 4% of trials. After identifying an emotion, the experimenter then asked participants to rate the intensity of this emotion by marking their responses on a drawing of a thermometer. Finally, the children were asked to rate their familiarity with the situation, again by marking their responses on a thermometer.

## RESULTS

### Mood questionnaire

Based on previous differences between the HSC and LSC groups (Rieffe et al., 2004), the first hypothesis was that children from the OP group would report more negative and less positive moods than the LSC group. The three groups' mean scores on the four mood states are shown in Table 2 and these findings confirm this expectation. It can be seen that the LSC group reported being happier than the two other groups, whereas this pattern was reversed for the negative moods anger, sadness and fear. A 3 (Group: OG, HSC, LSC)  $\times$  4 (Mood: happiness, anger, fear and sadness) analysis of variance (ANOVA) with repeated measures on Mood confirmed these main effects for Group,  $F(2, 137) = 15.96$ ,  $p \leq .001$ , and Mood,  $F(3, 411) = 263.15$ ,  $p \leq .001$ , and an interaction of Group  $\times$  Mood,  $F(6, 411) = 21.52$ ,  $p \leq .001$ . *T*-tests verified these noted differences per mood scale for the LSC group versus the two other groups ( $p \leq .001$  for all moods). An unexpected difference was found between the OP and the HSC groups: the OP children scored higher on Happiness ( $t = 2.19$ ,  $df = 88$ ,  $p \leq .031$ ). No other differences between these groups were found.

### Coping Focus questionnaire

It was assumed that children from the OP and HSC group would focus more on physical solutions than the LSC group (Physical Focus). A reversed pattern was expected with respect to responses that dealt with the negative emotion (Emotion Focus). A 3 (Group)  $\times$  2 (Coping Focus: Emotion Focus or Physical Focus) showed a main effect for Group,  $F(2, 137) = 9.60$ ,  $p \leq .001$ , and Coping Focus,  $F(1, 137) = 155.07$ ,  $p \leq .001$ , and an interaction of Group  $\times$  Coping Focus,  $F(2, 137) = 28.83$ ,  $p \leq .001$ . Overall, children more often reported the use of emotion-focused than physical-focused strategies ( $M = 2.35$ ,  $SD = 0.38$  and  $M = 1.84$ ,  $SD = 0.53$ , respectively). With respect to the Physical Focus, Table 3 illustrates that the three groups showed the expected pattern: the OP group had the highest score, whereas the LSC

TABLE 2  
Mean score on Mood as a function of Group  $\times$  Mood State

	<i>N</i>	<i>Happiness</i>		<i>Sadness</i>		<i>Anger</i>		<i>Fear</i>	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
OP	40	10.85	1.41	7.60	1.43	7.95	1.48	7.35	1.76
HSC	50	10.14	1.62	8.10	1.37	8.00	1.23	7.76	1.35
LSC	50	11.82	0.72	6.00	1.63	6.78	1.31	6.08	1.41

TABLE 3  
Mean score on Coping Focus as a function of Group  $\times$  Focus

	<i>N</i>	<i>Physical focus</i>		<i>Emotion focus</i>	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
OP	40	2.22	.44	2.38	.28
HSC	50	1.83	.51	2.25	.43
LSC	50	1.55	.44	2.42	.40

group had the lowest ( $p \leq .001$  for all comparisons between the groups). However, there were no group differences for the Emotion-Focus responses.

### Self-esteem questionnaire

It was expected that the OP and HSC group would report lower self-esteem than the LSC group. We also hypothesised that the LSC group would place less importance on aspects of their daily functioning about which they felt less confident. An ANOVA between the three groups confirmed a main effect for Group,  $F(1, 137) = 14.99$ ,  $p \leq .001$ . Post hoc  $t$ -tests confirmed that the OP group reported lower self-esteem than the LSC group ( $M = 45.03$ ,  $SD = 5.37$  and  $M = 48.92$ ,  $SD = 5.19$ , respectively,  $t = 3.49$ ,  $df = 88$   $p \leq .001$ ). Also, the HSC group ( $M = 42.94$ ,  $SD = 5.97$ ) had a lower score than the LSC group ( $t = 5.34$ ,  $df = 98$ ,  $p \leq .001$ ). No other differences were found. Second, correlations between children's scores on the self-esteem questionnaire and the parallel version on importance were significant for the OP group ( $r = .38$ ,  $p \leq .016$ ) and the LSC group ( $r = .48$ ,  $p \leq .001$ ), but not for the HSC group ( $r = .23$ ).

### Emotion-evoking vignettes

The alexithymia hypothesis predicts that children with more somatic complaints would be less able to identify their own emotions in hypothetically presented emotion-evoking stories than the LSC group (note that the data of *Control sample 2* were used only for the vignettes, whereas all former analyses are based on data derived from *Control sample 1*). Table 4 shows how often children in each group identified positive or negative emotions for the 16 vignettes (question 1). It can be seen that the data fail to support this hypothesis because very few children did not identify an emotion. This occurred even less often in the OP children. Instead, these children identified more negative emotions than the other two groups. All children identified happiness equally often. An ANOVA was not possible because the categories are not independent of each other. Separate  $t$ -tests, however, confirmed the observed difference between the OP and LSC ( $t = 3.98$ ,  $df = 64$ ,  $p \leq .001$ ) and

TABLE 4  
Mean score on Emotion Identification as a function of Group  $\times$  Emotion Valence

		<i>"How would you feel?"</i>					
		<i>No emotion</i>		<i>Positive</i>		<i>Negative</i>	
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
OP	40	0.08	0.27	4.10	0.55	11.83	0.59
HSC	26	0.85	1.35	4.00	0.00	11.15	1.35
LSC	26	0.85	0.93	4.08	0.39	11.07	0.93

between the OP and HSC groups ( $t = 2.77$ ,  $df = 64$ ,  $p \leq .001$ ) for negative emotions.

Children were also asked to rate the intensity with which they would feel the reported emotion on a thermometer from 0 to 100. A 3 (Group)  $\times$  2 (Emotion Valence: negative vs. positive) ANOVA with repeated measures on the last factor was carried out and showed a main effect for Emotion Valence,  $F(1, 89) = 222.22$ ,  $p \leq .001$ , and an interaction of Group  $\times$  Emotion Valence,  $F(2, 89) = 4.22$ ,  $p \leq .018$ . All children reported higher intensities for the positive emotions than the negative ones (Table 5). Concerning the negative condition, post hoc  $t$ -tests showed that the OP group reported a higher intensity of the identified negative emotions than the LSC group ( $t = 2.11$ ,  $df = 64$ ,  $p \leq .038$ ). No other differences were found.

The mean frequencies of children reporting that they thought they had been confronted with this kind of emotion-evoking situation (question 3) are also represented in Table 5, as a function of Group and Emotion Valence. Again, the positive condition showed no group differences. All children reported having experienced the same amount of positive encounters. This condition was experienced more frequently than the negative condition among all children. However, the LSC group reported having experienced

TABLE 5  
Mean score on Intensity and Frequency as a function of Group  $\times$  Emotion Valence

		<i>Intention</i>				<i>Frequency</i>			
		<i>Positive</i>		<i>Negative</i>		<i>Positive</i>		<i>Negative</i>	
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
OP	40	79.52	18.76	59.00	21.68	43.26	23.75	22.25	19.27
HSC	26	82.36	13.58	52.30	13.91	48.35	22.52	21.37	14.09
LSC	26	79.92	17.13	47.95	19.23	51.77	23.18	10.10	7.57

TABLE 6  
Mean score on somatic complaints as a function of Group

	<i>N</i>	<i>M</i>	<i>SD</i>
OP	40	15.85	3.18
HSC	50	16.68	1.46
LSC	50	10.06	1.06

the negative situations less often than the HSC and the OP groups. A 3 (Group)  $\times$  2 (Emotion Valence) ANOVA with repeated measures on the last factor was carried out and showed a main effect for Emotion Valence,  $F(1, 89) = 180.36, p \leq .001$ , and an interaction of Group  $\times$  Emotion Valence,  $F(2, 89) = 7.79, p \leq .001$ . Post hoc *t*-tests confirmed the noted differences (OP versus LSC:  $t = 3.06, df = 64, p \leq .003$ , and HSC versus LSC:  $t = 3.59, df = 50, p \leq .001$ ). No other differences were found.

### Somatic complaints

Finally, OP children filled in the Somatic Complaint List. The mean scores in Table 6 show that the OP and HSC group reported more somatic complaints than the LSC group ( $t = 12.07, df = 88, p \leq .001$  and  $t = 25.93, df = 98, p \leq .001$ , respectively). The SCL scores of the OP and HSC group did not differ.

## DISCUSSION

The findings of this study partly confirmed our expectations. Overall, the children who visited the out-patient clinic for abdominal pain showed a pattern of responses on the emotion indices that differed in the expected direction from children with few self-reported somatic complaints, who were taken from the general population in two different samples (Control samples 1 and 2). First, and in accordance with a previous study, OP children reported more negative and fewer positive mood states (Jellesma, Rieffe, Meerum Terwogt, & Kneepkens, 2006), and they reported negative emotions with a higher intensity and frequency. Second, they showed lower feelings of competence than their healthier peers but—unexpectedly—they did seem able to compensate for this. In other words, those aspects of their functioning that they felt less competent about were rated as less important by these children. Third, they indeed reported having to deal more often with the physical component of a negative emotional state. However, this did not prevent them from attending to the emotional reaction, which,

in contrast, was evident in children with many self-reported somatic complaints from a general population.

These findings do not seem to support either the alexithymia hypothesis or the symptom perception hypothesis. The affective component was recognised in all groups. Children with many somatic complaints (OP and HSC) showed a capacity to identify emotions in stressful situations (Control sample 1) and they also reported emotion-focused strategies to deal with their negative emotions to the same extent as their well peers (Control sample 2). Besides dealing with the emotional impact of stressful situations, children with more health problems showed a higher tendency to act upon the physical reactions under these circumstances. Thus, it is not an issue of "either/or" as the symptom perception hypothesis predicts. Instead, children with health problems thought they would apply both strategies. Possibly, these children have lesser understanding that the physical reaction in an emotion-evoking situation is an integrated part of the emotion experience: once the emotion is dealt with appropriately, the physical reaction—which is a part of this emotion experience—will wane automatically (Frijda, 1986). Alternatively, children with many somatic complaints may be aware of the link between their emotional and bodily symptoms, but they might feel the need to act on both. These children might apply fewer *adaptive* emotion focused coping strategies. For example, they might apply more avoidant or catastrophising and fewer reappraisal strategies, which would cause the negative emotion to persist. Sharrer and Ryan-Wenger (1991) noted that children with recurrent abdominal pain reported as many emotion-focused coping strategies as their well peers, but the clinical group found these strategies to be less effective. Further research should consider the content and effectiveness of their emotion-focused coping strategies more closely.

In defence of the alexithymia hypothesis, one could argue that even if children show the ability to identify their emotional state, it is still unclear if they can also differentiate sufficiently between different emotions. Alternatively, is the identified state perhaps a more global indication of their feeling? For example, feeling "bad" could refer to one or more specific negative emotions, such as anger, sadness, jealousy, or guilt. Only if one makes an analysis of the negative situation and identifies what elements caused the negative emotional reaction, can one differentiate between various emotions (Frijda, 1986). Future studies will consider this issue as a feasible link between emotion awareness and health. If this is true, an impaired analysis of the situation could, of course, also explain the suggested lack of adaptive emotion-focused coping skills.

Although the response pattern of the OP children largely coincided with that of the HSC children, there were some unanticipated differences. The OP children noted more negative emotions in peer-conflict situations and rated these with a higher intensity than the HSC group. This suggests an even more

impaired emotional competence. Yet, in some ways the children who looked for medical care seemed to be better off. Their more frequent happy mood states indicated a better emotion balance in this group (Levenson, 1999). Although their self-esteem was hampered they have learned to some extent to accept their limitations and compensate for them with other strong points. Possibly, the OP children feel less helpless in facing their problems and have more positive expectations since their physical problems are acknowledged not only by their parents, but also by external experts. Nevertheless, no other differences were found between the OP group and the HSC children. This is in line with previous research findings that it is difficult to determine which children have sought medical help for frequent health complaints based solely on their emotional functioning (Jellesma et al., 2006).

A limitation of this study might be that we did not verify the medical status of the OP and HSC groups. However, several studies have shown that whether or not a known medical disorder or disease can be identified in order to explain the physical complaints, appears to have little influence on the strong associations that are found between emotional functioning and pain complaints (Von Baeyer & Walker, 1999). Our underlying assumption is that an impaired emotional competence will cause more stress, which in turn could contribute to physiological problems in healthy children, but can also worsen symptoms in children already experiencing health problems.

Indeed, the distinction between organic or functional is increasingly thought of as no longer appropriate, since the aetiology of somatic complaints is often complex and can involve multiple factors (Mayer, 1996). As stated in the introduction, this relationship is probably reciprocal, because pain and other somatic complaints will also cause more stress and repeated absence from school and sport activities due to illness, thus hampering children in their social and emotional development. A cross-sectional design as used in this study cannot further illuminate on this issue; therefore, longitudinal studies are needed.

Manuscript received 4 May 2005

Revised manuscript received 24 July 2006

Manuscript accepted 18 January 2007

First published online 22 June 2007

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